



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

RESTRICTED

17121

DP/ID/SER.A/1070
13 October 1988
ORIGINAL: ENGLISH

IMPROVING QUALITY OF PROCESSED MARINE PRODUCTS

DP/VIE/87/002/11-51

VIET NAM

Technical report: Establishment of quality control and
canning development line at SEAPRODEX plant Nr. 2 - Preparatory assistance*

Prepared for the Government of Viet Nam
by the United Nations Industrial Development Organization,
acting as Executing Agency for the
United Nations Development Programme

Based on the work of Ole Kirkgaard,
Consultant in fish processing

Backstopping Officer: B. Galat, Agro-based Industries Branch

United Nations Industrial Development Organization
Vienna

3a/2

* This document has not been edited.

V.88-29599

TABLE OF CONTENTS.

	Page
I. INTRODUCTION.	4

A. National Objectives	4
B. Fisheries Sector Objectives	5
II. BACKGROUND.	5

A. Catch	5
B. Fishery Sector	6
C. Sectorial Setting	6
D. SEAPRODEX	7
E. Catching	8
F. Processing	9
III. THE PROJECT.	10

A. Objectives	10
B. Project Scope	10
C. Optimal Production	11
IV. PROJECT DEFINITION.	11

A. Landing Facilities	11
B. Canning Development Line	12
C. Laboratory	12
D. Existing Production	12
E. Consulting Service	13
F. Long term Expansion Potential	13
G. Implementation Management Requirements	13
H. Implementation schedule	14
I. Manpower requirements	15
V. PROJECT JUSTIFICATION.	16

A. <i>findings</i> F ounds in Production	17
B. Improvements of Quality and Production	18
VI. OUTPUTS.	19

A. Output. I.	19
B. Output. II.	19
C. Output. III.	19
D. Output. IV.	19
E. Output. V.	19
F. Output. VI.	19
G. Output. VII.	19
VII. INPUTS.	20

A. Government Input	20
B. UNDP/UNIDO Input	20

	Page
VIII. PREPARATION OF WORK PLAN. -----	21
IX. PREPARATION OF THE FRAMEWORK FOR EFFECTIVE PARTICIPATION OF NATIONAL AND INTERNATIONAL STAFF IN THE PROJECT. -----	22
X. PRIOR OBLIGATIONS AND PRE-REQUISITES. -----	22
A. Prior Obligations	22
B. Pre-Requisites	22
XI. UTILIZATION OF THE EXPERT ACTIVITIES -----	23
XII. CONCLUSION -----	23
XIII. RECOMMANDATIONS. -----	23
 APPENDICES. =====	
APPENDIX I. Laboratory Equipment	25
APPENDIX II. Canning Line Equipment	28
APPENDIX III. Fish Processing Technologist-Job Descr.	29
APPENDIX IV. Laboratory and Quality Expert-Job Descr.	31
APPENDIX V. Project Schedule	33

I. INTRODUCTION.

The main purpose of this report is to provide UNIDO with information related to the visit of Mr. Galat and Mr. Kirkegaard at SEAPRODEX in Viet-Nam, to indicate the problems or constraints which have been encountered or are foreseen.

The team arrived at Ho Chiminh City the 17th June and went to Hanoi the 28th June for meetings with the Ministry of fishery and UNDP, the team left Hanoi 1st July for Vienna and Copenhagen.

Excellent assistance has been extended from all of the SEAPRODEX staff and the government's officials contacted, and the team is confident that this will continue throughout the project.

A key factor in the assessment of SEAPRODEX plant no.2 at Ho Chiminh City development has been the availability of data from the SEAPRODEX management. In order to benefit from local experience with processing plants, data relating to the project at plant no.2.

A. NATIONAL OBJECTIVES AND POLICIES.

The country's development plan for the period 1986 - 1990 is intended to form the basis for shaping the countries for further progress by consolidating and expanding the base established under the preceding development plan background.

The main sectoral objectives of the Country Plan (C.P.) as indicated in the Third Country Programme Document for Viet Nam under the National Development Strategy are, among others to increase and diversify industrial production, particularly to supply consumer goods and to increase exports, by means of increased exploitation of raw materials and more efficient utilization of existing production capacity.

Also under the new programme proposed by the C.P. it is mentioned that rapid improvements are required for the up-dating of the design and production methods used in the industry to overcome many years' lack of contact with modern techniques.

In the specific marine products sector, the objectives is to improve the quality and packing of processed products to modern processing technology and to increase the production of value-added products, particularly for export markets. Higher participation of value-added products, better utilization of by-products and waste, and overall modernization should result in improving the economic position of the sector.

B. FISHERIES SECTOR OBJECTIVES.

The Ministry of Fisheries' overall objectives in the sector as stated in the Third Country Programme is to develop and manage the exploitation of Viet Nam's fisheries resources to secure optimum social and economic benefits for the people of Viet Nam , specifically to :

- Achieve and maintain self-sufficiency in the supply of fish to the domestic market;
- Improve cash incomes throughout the fisheries sector;
- Increase fishing and the production at SEAPRODEX in Ho Chiminh City and in the provinces;
- Improve the foreign exchange position of Viet Nam.

II. BACKGROUND.

Viet Nam has a coastline of 3,260 km and have a total sea surface of 1,000,000. Km2 (based on a 200 nautical mile EEZ.) Furthermore they have an aquatic area suitable for culture of 1,350,000 ha. consisting of :

- Pond 56,200 ha.
- Field 544,500 ha.
- Big water surface 394,500 ha.
- Brackish tidal plain 290,100 ha.
- Bog 26,700 ha.
- Straits , bays 56,000 ha.
- Cultured area 120,000 ha.

A. Catch.

The national catch and harvest in 1987 was :

Quality and Species (Thousand tons)

TAC/quantity	Sea water: 3000	Shrimps:250.	Inland fish:340
Present catch/year.	785	50 - 60	21-28
Potential catch	1344	200	340
Highest catch	925	65	28
Estimate 2000	1250	100	

Special items.

- Squid	12,900 mt/year
- Other fish types	22,200 mt/year
- Lobster	1,000 mt/year
- Slipper lobster	26,300 mt/year
- Acetes	62,000 mt/year
- Crab	3,400 mt/year

B. Fishery Sector.

The ministry of Fishery has for some years tried to increase the fishery, and the result is that there are now more than 250,000 fishermen, operating 43,490 engined boats and 32,021 inboard vessels with a total of 517.915 HP. The way of fishing in Viet Nam waters is normally with net setting, trawling, seiner net, gill net etc...

To take care of the landed fish there are now 63 freezing plants operating and they are able to freeze 353 mt/day and have a holding capacity on their cold stores of 8,200 mt.

To supply the fishing fleet with flake ice, several flake ice plants along the coast are running, and the total daily production reaches 1,500 mt.

The transfer of equipment to Viet Nam has been of a smaller impact than expected, due to poor performance of some projects, and State enterprises and foreign transfers, combined with a moderately high tariff rate has contributed to the over-value of the Dong. The economy is relatively closed and there is a high degree of control with the exchange rates and solely USD can be changed - a fact which creates considerable difficulties in connection with foreign joint venture partners, especially from the COMECON countries.

C. SECTORIAL SETTING.

The fishery sector plays an important part in the Vietnamese economy. It is the major source of foreign currency earnings and a major employer. In 1987 industrial production of fish in Viet Nam reached 1,000,800 mt. but the total export only reached 92,897 mt. equal 9.2 % of the total catch (figures given by SEAPRODEX) and the export was split on the following

Special items.

- Squid	12,900 mt/year
- Other fish types	22,200 mt/year
- Lobster	1,000 mt/year
- Slipper lobster	26,300 mt/year
- Acetes	62,000 mt/year
- Crab	3,400 mt/year

B. Fishery Sector.

The ministry of Fishery has for some years tried to increase the fishery , and the result is that there are now more than 250,000 fishermen , operating 43,490 engined boats and 32,021 inboard vessels with a total of 517.915 HP.

The way of fishing in Viet Nam water's is normally with net setting , trawling , seiner net , gill net etc...

To take care of the landed fish there are now 63 freezing plants operating and they are able to freeze 353 mt/day and have a holding capacity on their cold stores of 8,200 mt.

To supply the fishing fleet with flake ice , several flake ice plants along the coast are running , and the total daily production reaches 1,500 mt.

The transfer of equipment to Viet Nam has been of a smaller impact than expected , due to poor performance of some projects , and State enterprises and foreign transfers , combined with a moderately high tariff rate has contributed to the over-value of the Dong. The economy is relatively closed and there is a high degree of control with the exchange rates and solely USD can be changed - a fact which creates considerable difficulties in connection with foreign joint venture partners , especially from the COMECON countries.

C. SECTORIAL SETTING.

The fishery sector plays an important part in the Vietnamese economy. It is the major source of foreign currency earnings and a major employer. In 1987 industrial production of fish in Viet Nam reached 1,000,800 mt. but the total export only reached 92,897 mt. equal 9.2 % of the total catch (figures given by SEAPRODEX) and the export was split on the following products:

Shrimps	20,397 mt.
White	62,500 mt.
Squid	1,800 mt.
Other , special products	8,200 mt.

D. SEAPRODEX.

SEAPRODEX was established in 1978 as an export and production organization by the Ministry of Fishery. The project was intended to expand the production and the export of fish products from Viet Nam waters and thus improve the country's foreign currency earnings.

In 1987 UNDP/UNIDO was asked by SEAPRODEX through the Ministry of Fishery to support them for development of their production, laboratory, landing facilities and expert assistance, so that it would be possible to enable the Vietnamese people to develop a higher level of managerial and technical skills , increase the production of fish products for domestic consumption and exports , and obtain an adequate return to SEAPRODEX.

The company's specific objectives as identified in the strategy plan includes:

- Export of fish products to world markets at a price giving the maximum return in foreign currency;
- Handling and processing the fish means of high-yield and low - cost techniques;
- Provide training and work opportunities for the vietnamese people.
- Increase the production of fish products in the forms required by the domestic market.
- Optimizing the company's economic results.

E. CATCHING.

The fishery sector in Viet Nam comprise of three categories, the village level and the subsistence fishery. The most important from the perspective of this study is the large-scale commercial sector (sometimes referred to as industrial).

Subsistence coastal fishery normally complements garden crops production in coastal communities and provides the major part of the vietnamese protein intake. Production is sporadic (drying on wood nets) and employs manual collection techniques or fishing from boats using simple gear.

The government has made considerable efforts over recent years to develop the commercial fishing sector. The programme has concentrated on the provision of ice plants , landing facilities , cold stores and drying facilities in the provinces , but these have experienced hygienic problems and most are currently under-utilized.

Predictions of future landings in the fish sector is notoriously difficult , due to the wide variety of factors which govern both catch and effort. However , at present ,there are reasons to predict that landings will expand , more or less in proportion to the efforts from fishermen and the support from the Ministry of Fishery. The speed of development will largely be governed by the economics of the fishery and the performance of the vessels currently fishing or being aquired , to reach the estimate for year 2000 as scheduled on page 4.

F. PROCESSING.

Viet Nam has a tradition of fish preservation (dried fish) in small scale , but in the recent 10 years the industrialized production has taken form .

Commercial preservation of fish in Viet Nam comprise of the processing of shrimps , squids , scallops , mackerel , pomfret , red snapper , grouper , cat fish , shark fins , and some minor types into dried or frozen products.

The processing is currently undertaken by SEAPRODEX at their factories in Viet Nam and with some support from their joint venture partners. SEAPRODEX expects to reach a total production of 200,000 mt/year in 1990,if they get financial support from donors. The aid has to be in the form of experts, modern laboratory and processing equipment.

III. THE PROJECT.

A. OBJECTIVES.

The project focus on the introduction of quality control and a canning development line in Viet Nam. The primary objective of the project is thus the development of a profitable and economical production with high quality control, and training facilities in laboratory and in the canning production. The adding of value to an export of finished fish products is seen as a desirable objective by the Ministry of fishery, through its beneficial impact on both foreign currency earnings, training of the viet-namese people and a growing employment. Maximizing these impacts represents a major secondary objective of the project.

B. PROJECT SCOPE.

The scope of assistance to SEAPRODEX at their plant nr. 2 in Ho Chiminh City specialized in the production of some specific aquatic and other processed products is to:

- 2.1. Introduce and establish facilities to do bacteriological, chemical and physical testing. Quality control on raw materials and finished products, for a canning development line, a water purifier unit and packaging materials;
- 2.2. Prepare a collection of selected and tested methods/procedures for practical applications in laboratories and at the canning development line established within the project as well as in other plants;
- 2.3. Provide adequate support for product development, testing, advanced production technologies and packages, and introduce activities aimed at increasing value-added and diversification of production of products such as canned mackerel, scallops, tuna, shrimps etc.. in addition to frozen and dried products;
- 2.4. Study possibilities and carry out practical tests on the utilization of by-products and waste, such as shrimp heads, squid, bones, skin and scallops and etc.. for animal food or any other purpose; determine technical and economical viability of processing by-products;
- 2.5. Train counterpart personnel in laboratory testing, laboratory control techniques, instruments, canning development, product development and advanced processing technologies for marine products, including by-products and wastes, waste water treatment; it is expected that the new experience gained also will be applied to other plants processing marine products.

C. OPTIMAL PRODUCTION.

There are several key determinations of optimal production for the factories belonging to SEAPRODEX , and they are as described :

- FISH AVAILABILITY is considered as being non-limited ,based on current projections. There are several foreign vessels licenced to fish in Viet Nam waters , and if the production increases more than foreseen ,some licence to foreign vessels can be withdrawn and cover the vietnamese need.
- CANNING LINE CAPACITY should be defined in increments of 24,000 cans/day : the production capacity of a standard processing line.
- LABORATORY should be defined to make it possible to run tests and quality control.
- UTILITIES sufficient water should be available (as soon as a purification plant) is installed ,from natural resources to enable the total production on plant no.2 in Ho Chiminh City. Electrical supply is not a constraint , and in case of black-out the factory has a stand by-generator.
- MANAGEMENT/TECHNICAL SKILLS It will be necessary to stage any development , and for this purpose it will be necessary to send two experts , one for training in laboratory control (quality control) and one for processing technology. These two experts has to be recruited as the first part of the project , to be sure that experts are available.

IV. PROJECT DEFINITION.

The following section discusses the main recommended component of the project , and the project costs are defined later in the report.

A. Fish Landing Facilities.

An efficient fish handling system should be introduced at the landing places , and there should be a full supply of flake ice at the landing places. The personnel on the boats and on land should be trained in handling the fish in a proper way and plastic bins/boxes should be introduced. The landing places should be provided with storage rooms until collection , run- ning water , toilet and dress facilities. To secure good hygienic conditions a good cleaning routine for the facilities should be introduced.

B. Canning development line.

The proposed canning development line is designed for a production of 60 cans/min. and the seamers are equipped with tools for two piece cans 185 gr. (diameter 87 mm , 40-116 mm high). These tools have been selected due to the fact that it is the most utilized type of cans in the fish industry.

Rejection of canned fish products by health authorities in the importing countries represents one of the major threats facing the producers. This particularly affects new producers in developing countries. The design of the canning development lines are thus focused on high quality production , which will offer effective competition to the higher value and more quality aware market. The US Food and Drug Administration (FDA) guidelines for canned fish quality are generally accepted as the industry standard , and from this standard the lines are designed.

C. Laboratory.

The proposed laboratory is designed for the latest new equipment available on the market. With this equipment it will be possible to meet all demands of tests from customers on raw material and finished products.

In connection with the laboratory there are 3 rooms available as class rooms for training the staff in laboratory control and fish processing. All furniture for the class rooms will be delivered by SEAPRODEX.

D. Existing Production.

As the experts sent from UNDP/UNIDO will soon as they arrive to plant no. 2, start the investigation and schedule the rehabilitation of the existing production. As their first step they will try to rehabilitate the production so that it runs according to the norms given by US Food and Drug Administration to protect the production against rejection from the end-users.

The team knows that grants will not solve all difficulties Considering the fact that grants will only be able to facilitate the initial phases. It will take several years before the production has reached the standard seen in European fish factories , but it will be a good start for the Vietnamese to learn how to solve the quality and processing standards.

The existing water supply is good and steady, but it is not

clean so the proposed water purifier is strongly needed.

E. Consulting Service.

For the project design it is recommended that a project manager (could be the Processing Expert) is appointed to select and supervise the consultant(s) required in the various technical areas. He would also supervise the tendering process and co-ordinate the consultant (s) engaged in construction.

It is recommended that the Project Manager and the Laboratory Expert goes to Vienna for tendering and purchase of the equipment together with the staff of UNIDO , and that the Project Manager goes to Seaprodex plant no.2 eight months before the equipment arrives for making a drawing of electricity , water and drains required for the equipment ,and to assist plant no.2 in doing it correctly.

F. LONG TERM EXPANSION POTENTIAL.

Space has been allowed in plant no.2 for future expansion. The need in the future when staff has been trained will be freeze-drying , waste water treatment , by-product processing, flow-freezer , continuous vacuum packing system , high speed canning line , fish meal plant and upgrading of fish landing places with modern equipment and facilities etc..

It should be mentioned that the team only have seen one landing place and the factory Dong Nai marine services , so what is really needed at SEAPRODEX all over Viet Nam in the next 10 years is impossible to say , but there is no doubt that they should be assisted now , if they are to survive.

G. IMPLEMENTATION MANAGEMENT REQUIREMENTS.

The key requirements for the project are to control costs , achieve the required standards and minimize tender , purchase, delivery and erection time. Each of these points are critical. The first priority in the implementation program is to establish clear responsibility for the specifications of the project design criteria and parameters. It is essential that a person is available to represent the interest of UNDP/UNIDO. He must be available at the outset of the project design phase and be fully informed of the project's technical contents and requirements. He must be authorized to make decisions and approve design specifications and parameters as required. As such decisions will effect the the basis operating environment of the project , as well as erection costs and implementation time , the individual appointed should have an ongoing commitment to the success of the project.

The person to assume this responsibility on behalf of UNIDO should be appointed directly by UNIDO and be solely responsible to UNIDO, and will enable his experience in processing technology to be applied to project design and implementation.

The project will involve several major programmes covering civil engineering works such as electricity, water, drains, steam, compressed air and some special building construction works.

The second component of the implementation programme is the identification and procurement of resources necessary to operate the laboratory and the canning development line. These resources include the skilled manpower, process and education materials required for running the project. The responsibility for these activities should fall uniquely on the person chosen by UNIDO for the project.

IMPLEMENTATION SCHEDULE.

The major elements of the implementation programme are:

- agreement between the UNDP/UNIDO and the Ministry of fishery on the project;
- selection of a project manager for;
 - . overall project management
 - . design of civil construction
 - . equipment specification and installation design
- pre-qualification, tendering and assessment of equipment suppliers;
- study tour ;
- installation of equipment ;
- plant commissioning ;
- staff training at plant.

The estimated total elapsed time for the completion of the documents is 30 months. This is considered to be the minimum realistic time schedule for the implementation of the project as defined.

THE PRE-IMPLEMENTATION PHASE encompasses all those activities which are required prior to an award of physical contracts. In considering the approval and negotiation requirements as well as design and documentation, the earliest possible time for award of contracts will be by the end of September 1988.

THE PROJECT IMPLEMENTATION PHASE with the earliest start in January 1989 is the period required for mobilization, physical construction, procurement and installation of equipment as well as testing and commissioning of the project.

It is estimated that the first trial run of the project could commence at the beginning of December 1989 with an achievable hand over of the equipment by the 1st of April 1990 followed by a 12 month maintenance period. The implementation schedule assumes that no unusual delays are experienced in the decision making processes by the UNDP and in the selection of a Project Manager. Tendering and procurement contracts are assumed to be conducted under international invited bidding.

I. MANPOWER REQUIREMENTS

The total skilled manpower to run the laboratory (quality control) and the canning development line are:

Name.	no.	local.	UNIDO.
Processing Expert (Project Manager)	1		x
Laboratory Expert (quality control)	1		x
Processing technicians	3	x	
Quality control	3	x	

TRAINING.

The staff training necessary to provide the skills for the operation of the laboratory and the canning development line are outlined in two categories;

- the development of laboratory and technical skills which requires some attendance at appropriate academic or technology institutions ;and
- the training of hands-on skills which will require the individuals to actually work for a period within an established fish processing plant in Denmark.

For courses requiring attendance at an institution , it will be necessary for staff selection to be made well in advance of the scheduled erection of laboratory and canning development line date so that their attendance at appropriate courses can be arranged.

Training of a hands-on nature is likely to be undertaken within a fish processing plant operated with the latest technology in Denmark. The provision of this training should be a part of the formal obligation of UNIDO under the terms of grant specification.

The hands-on training will generally need to be undertaken in the few months immediately prior to the commencement of the canning and laboratory operations.

It is recommended that a total of eight individuals receive formal training at appropriate institutions and undertake training in a hands-on environment. All key staff should visit a high technology plant to become familiar with the overall operating environment. Once the laboratory and cannery commence operation , extensive in-service training will be necessary to develop skills and to expand the number of trained staff to meet production expansion requirements.

V. PROJECT JUSTIFICATION.

1. It is estimated that some 25-30% of the catch ,particularly during the high season , is not fully utilized for human consumption due to the shortage of lack of flake ice , refrigerated storage and proper processing facilities. Some 40% of the catch is processed primarily by traditional methods and on a non-industrial scale , by simply drying salting and fish sauce production , less than 10% is processed on industrial and semi-industrial scale. By-products and wastes are hardly utilized.

2. Technical assistance is to be provided to the Seaprodex plant no. 2. The plant is processing speciality products such as squids , shrimps and scallops as well as some other products , such as shark fins etc..

The plant is of particular interest to the Ministry of Fisheries because of their export orientation (Hong Kong , Singapore , Japan) and there are possibilities to export to other countries as well.

The personnel of the plant consists of about 1,000 employees and most of the work is done manually . The buildings are old and their drain systems are in a bad condition , the systems allows rats to live there.

In the production area there are a lot of tables for processing. Some are made of concrete, other of wood and 20% of stainless steel with a frame of galvanized steel, and they need new paint. The walls has tiles and the roof is made of painted wood and in some places there is open directly up to the beams. Equipment and the conditions are unsatisfactory.

A. Founds in production.

-
- The tables had not been cleaned underneath;
 - the tables of concrete had some damages which creates possibility for bacteria infection in the products produced on these tables;
 - the drains stood half full of smelling water and creates home for all kind of insects and rats;
 - there were no places with poison for rats;
 - the water bassins had damages and the water for processing was in such a condition that it never should have been allowed for production;
 - the raw materials were delivered in wooden baskets with a minimum of ice, and some were delivered without ice and first iced at the plant. The wooden baskets are not possible to clean in a proper way, so even here there is a risk of infection;
 - the personnel for descaling was not dressed in white dress but was wearing their own clothes, and it was not always fit to be used in a production area;
 - the descaling took place in an open area with free passage for birds etc..;
 - the quality control was done by smell and optical inspection;
 - there were toilet facilities for the workers, but there were no running water, toilet paper, sinks, hand towels, showers, dressing rooms;
 - the plant had no canteen facilities so the workers had to sit on the ground eating their food and after lunch go directly back to production without changing clothes or washing hands;
 - there is free access from the production to open areas;
 - the walls were not washed down, and the dirt was sticking to the fingers when touching the tiles;

- sorting and packing of dried products took place on the floor or at wood tables;
- all drying nets was made of wood;
- washing of dried squid was done with water from a small sink and was were seldom changed;
- vacuum packing took place as follows : The operator pressed out some air of the bag an then sealed it. There was probably 55% air back;
- there is no packing and expiry date on the products;
- all weighing equipment at the plant was in a very bad condition.

B. Improvements of quality and production.

In order to improve the quality of products , maintain or expand the export and diversify production , it is nessesary that SEAPRODEX plant no.2 introduce:

- 1 Systematic control of raw materials and finished products including water for processing and ancilliary materials , applying bacteriological , chemical and physical methods (micro - organisms' identification and counting protein , oil, salt, ash content , moisture content , organoleptic properties etc..);
- 2 system of standardization for various products in order to maintain uniform quality , both nutritional and commercial;
- 3 canning development line for development of new products and laboratory tests of the products , small scale production (60 cans/min.) for market tests;
- 4 product development to diversify production , particularly in value-added products , including by-products processing.

Facilities and technical personnel for these activities do not exist at present and the company is loosing extra income which otherwise may be increased through better quality and higher value-added products as well as through utilization of by-products and wastes. In order to achieve this , external assistance is required , both in expertise (consultants services , training) and equipment. Once the facilities are established and the personnel trained , they may serve other similar plants within the group.

VI. OUTPUTS.

A. Output 1.

Established bacteriological laboratory equipped for testing contamination and bacteriological quality of raw materials , finished products , process water and other materials (identification of micro-organisms , their countings , maintaining strains for fermentation process , water chlorination control);

B. Output 2.

Established laboratory for determination of quality and composition of product by chemical , physical and sensory methods (protein , salt , oil , ash , moisture content , colour, physical properties etc..);

C. Output 3.

Established canning development line for development of new products so as canned tuna , shrimps , squid in sauce , pet food and other value-added products, erect new vacuum packing machine to increase the quality and make products more attractive;

D. Output 4.

Collection of selected procedures , methods and criteria for microbiological , chemical , physical and sensory determination of products quality ; established criteria to judge the quality of products on the basis of laboratory test results;

E. Output 5.

Detailed programme for systematic activities related to products development , including by products and wastes;

F. Output 6.

Trained personnel for carrying out bacteriological , chemical physical and sensory determination of quality and composition of products , product development on the canning development line and operation of the techniques;

G. Output 7.

Operational quality control and products development service capable of providing assistance to other industrial plants under the Ministry of Fisheries.

VII. INPUTS.

A. Governments input (in kind)

National staff.

- National project co-ordinator.	1
- Deputy plant manager (SEAPRODEX)	1
- Department chiefs	5
- Laboratory research technicians	2
- Technical services staff	20
- Administration support personnel	10

Other national inputs:

- buildings , offices;
- facilities for laboratory and canning development line.
- photocopying and typing equipment ,water, electricity etc..;
- local costs for fellowships and study tours fellow;
- lodging for experts in furnished flats or houses.

The government's contribution in kind , according to the above general list , corresponds to approximately :

202 Millions Dong.
=====

B. UNDP/UNIDO inputs

International staff

1 Fish Processing Expert (Project Manager)	12 m/m
1 Laboratory Expert	6 m/m
Prep. Assistance Consultant(s)	1 m/m
Experts total	19 m/m

TRAINING.

1 Microbiologist	3 m/m
1 Biochemist	3 m/m
1 Fish Product Development Expert	3 m/m
1 Canning Technologist	3 m/m
1 Fish Freezing Technologist	3 m/m
1 By-product Technologist	3 m/m
1 Fish Product Packaging Expert	3 m/m
1 Technicians	3 m/m

STUDY TOURS.

4 Professionals in fish processing , quality control	4 m/m
---	-------

Suggested countries are Denmark and Faroe Island where it is possible to see high technology in canning ,filetting , production of ready meals and pet food .

The exact timing of the fellowship and study tours is to be determined according to the fish Processing Expert (Project Manager)'s schedule.

EQUIPMENT.

UNDP/UNIDO contribute to the project with equipment as listed in appendix I + II.

VIII. PREPARATION OF WORK PLAN.

A detailed work plan for the implementation of the project will be prepared by the International Project Manager assigned to the project in co-operation with the local Project Manager. This will be done at the start up at the project and brought forward periodically.

IX. PREPARATION OF THE FRAMEWORK FOR EFFECTIVE PARTICIPATION

OF NATIONAL AND INTERNATIONAL STAFF IN THE PROJECT.

The activities necessary to produce the indicated outputs and achieve the project's immediate objective will be carried out jointly by the national and international staff assigned to it. The respective roles of national and international staff will be determined by their leaders, by mutual discussions and agreements, at the beginning of the project and set out in a framework for effective participation of national and international staff in the project.

The respective national and international roles shall be in accordance with the established concept and specific purpose of technical co-operation.

X. PRIOR OBLIGATIONS AND PRE-REQUISITES.

A. Prior obligations.

NONE.

B. Pre-Requisites.

In order to obtain maximum benefit most from the project activities and to ensure achievement of the planned outputs, the government authorities and the project counterparts should:

- (a) Secure space for laboratory and canning development line, and bring them into a condition which allows them to produce under high hygienic standard. Therefore the International Project Manager should be involved, before the facilities are erected or renovated;
- (b) Hire and provide in time counterpart personnel with adequate qualifications;
- (c) Take the necessary actions to timely select candidates for fellowship and study tours, who should meet the language requirements or be assisted by an Interpreter from Viet Nam.
- (d) Secure tax free import of all type of machinery and equipment needed.
- (e) Secure easy customs clearance of all goods.

XI. UTILIZATION OF THE EXPERT ACTIVITIES.

The experts connected to the project has to train the local staff in daily use of laboratory equipment for testing raw materials and finished products , can seaming test , development of new product , how to operate and service an automatic canning line and most of all how to keep a high hygienic standard in the production.

Further-more they have to advice/train the management in modern technology an processes used in I-countries, they have to help SEAPRODEX with up-grading landing facilities , handling of fish at sea , transport of raw materials , rationalize other factories in the group, and help in planning of future investment in new production facilities/equipment.

The experts has to assist SEAPRODEX in negotiations with aid organisations , supporting SEAPRODEX with all materials nessessary for the formulation of the proposed project.

XII. CONCLUSION.

Viet-Nam is one of the world's most favored nations for development or expansion of the fish industry , and they have contact to several countries for export of fish products , but as described their technology and quality control are very poor and they are loosing money in their production caused to the fact that a lot of products are rejected as bad quality.

The product are from the start treated badly , no ice at landing place , no refrigerated trucks , low capacity of cold stores and chilled rooms , unhygienic processing facilities , no knowledge of modern packaging technology and no trained foremen in the production and management.

XIII. RECOMMENDATIONS.

Viet-Nam has for a long time not received any new inputs of technology from I-countries in the food industry. Therefore the first step to go forward will be to send a Fish Processing Expert and a Laboratory and Quality Expert to SEAPRODEX together with modern laboratory and processing equipment to train the local staff. At the same , time it will be nessessary to send some of the local foremen abroad for training in a modern fish industry and fishery school.

When the local foremen return to Viet-Nam they had to assist the experts in training the local staff not only for SEPRODEX plant no. 2 but also staff from other plants.

With doing this the process will have started, but UNDP/UNIDO must not lose the interest for the Vietnamese fish industry because they will need a support in the future in training and equipment, new processes such as freeze drying, canning, smoking, freezing, ready meals, pet food and waste water treatment has to be introduced in Viet-Nam.

The experts sent to Viet-Nam has to assist SEAPRODEX in planning and formulating the direction for the future expansion in the fish industry.

APPENDIX I.
=====

LABORATORY EQUIPMENT.

- 1 Gerhard destructor block type KI8
- 1 Exhaustion for above Gerhard AD 8 ,complete with water jet air pump and floor brackets.
- 20 Glasses for the above , 250 ml.
- 1 Distilling device , Gerhard vadopest automatic , complete with standard equipment.
- 1 TVN test set
- 1 Histamin test set

ALTERNATIVE.

- 1 Distilling device , vadopest - 1.
- 2 Memmert universal cabinet type TV 15 U , door.
- 2 As above , but with glass door.
- 50 Porcelain evaporation dishes,with flat bottom diameter 55 content 30 ml , 2 size.
- 2 2,5 kg pumice granulated.
- 2 Crubible barrels black return bent 20 mm.
- 1 Mobilex desiccator diameter 300 mm.
- 1 Desiccator sealing ring for above.
- 1 Desiccator plate , porcelain diameter 280 mm.
- 1 kg silicagel.
- 1 Manuel refractometer b & s.
- 100 Demeter pipettes with 3 marks , 0.5 - 1.1 and 1.1 ml.
- 18 Graduated pipettes for peave 10 ml.
- 1000 Plastic petri dishes 30 x 15 mm.

- 80 Bottles , Pyrex 100 ml. with screw cap.
- 100 Reagent bottles with screw cap pyrex 180 x 18 ml.
- 4 Test tube frames for 3 x 12 glasses.
- 2 Alarm clock 0 - 60 min.
- 2 Conical , bottom 2000 ml Pyrex.
- 4 Scale glasses 100 ml.
- 4 As above 500 ml.
- 6 Graft mail stands.
- 10 Graft platinum filament , 0.7 mm.
- 1 Sterilizing case aluminium 420 x 60 div. chemicals.
- 1 Autoclave time relay with adjustment 0 - 30 min. mounted in splash proof box for wall mounting.
- 2 Stainless steel inner basket with handle and with a height of app. 200 mm according to agreement.

SCALE AND CONTROL EQUIPMENT FOR CANS.

- 1 Profile projector type LP 6.
- 1 Thickness meter folds nr. 2000 with special 1/1000 tesa diameter.
- 1 Saying saw for cans , with double blades and motor.
- 1 Tiv shears.
- 1 Compression test device.
- 2 Scales 0.01 gr.- 1,000 gr.
- 2 Scales 2 gr. - 5,000 gr.

DIFFERENT EQUIPMENT FOR LABORATORY.

- 1 Microscope , binocular , 40 - 1250 x magnification.
- 4 Colony counter.
- 1 Drying oven.

- 2 Freezers - refrigerators.
- 6 Bunsen burner with holder.

DIFFERENT EQUIPMENT.

- 1 Water purification plant 5m³/hour.
- 1 4 wheel drive car.
- 1 Vacuum packing machine with 2 chambres.
- 1 Boiler 700 kg/hour 10 ato. complete with chimney and water softner.
- 1 Set of video-visual training equipment.

APPENDIX II.

=====

CANNING LINE EQUIPMENT.

- 2 Rotary infeed table.
- 1 Empty can washer.
- 1 Conveyor 2000 mm.
- 1 Rotary pocket filler.
- 1 Checkweigher.
- 1 Brinefiller.
- 1 Conveyor 3000 mm.
- 1 Automatic seamer , capacity 60 cans/min.
- 1 Washing machine with 2 chambres.
- 2 Rotary table.
- 1 Retort for 4 trolley's , and with 12 trolley's.
- 1 Automatic labelling machine.
- 1 Roller conveyor 1000 mm.
- 1 Automatical tape unit for cartons.
- 1 Roller conveyor 4000 mm.
- 1 Cooking vessel.
- 1 Cooling vessel.
- 6 Net for above.
- 1 Demag lift capacity 1 ton.

APPENDIX III.

=====

FISH PROCESSING TECHNOLOGIST

JOB DESCRIPTION

Post title Fish Processing Technologist.

Duration Twelve months over a period of eighteen month.

Date required April 1989.

Duty station Ho Chiminh City.

Purpose of project : To assist SEAPRODEX plant no.2 to establish laboratory , canning development line ,vacuum packing machine , introduce quality control of raw materials and finished products

Duties : In co-operation with government authorities , personnel of seaprodex and individual Consultant(s to be engaged within the project , the consultant is expected to:

(1) as a team leader :

- Monitor and co-ordinate project activities in respect to the recruitment of individual consultants , organization of study tour and individual fellowships, purchase and installation of equipment;
- Prepare a detailed work plan for the project activities and follow it up;
- prepare periodic reports and the draft terminal report;
- participate in tripartite review (TPR) meetings;

(2) as fish processing technologist;

- Make an assessment of the existing production facilities,(processing technology and quality of products);

- Determine testing and quality control methods and procedures to be introduced;
- assist in determining equipment requirements and the preparation of equipment specifications;
- participate in product development and quality control activities;
- participate in on-the-job training of counterpart personnel in processing technology and quality control;
- inspection of landing facilities and in co-operation with the fishermen and SEAPRODEX try to up-grade the facilities to an acceptable standard;
- assist SEAPRODEX at other plant in introduction of modern technology and how to improve the quality.

The Consultant will also be expected to prepare a Final Technical Report , setting up all the findings of his/her missions and recommendations to the government on the follow-up action which might be taken , and point out future investment for the government and UNDP.

Qualifications: Fish Processing Technologist with at least ten years experience in industrial processing and development of new products . Particular in freezing , drying and canning of shrimps , squids and other marine products desirable.

Language : English

APPENDIX IV.
=====

LABORATORY AND QUALITY EXPERT.

JOB DESCRIPTION

Post title Laboratory technologist.

Duration Six month.

Duty station Ho Chiminh City.

Purpose of project: To assist SEAPRODEX plant nr. 2 to establish laboratory, quality control of raw materials / finished products and train local staff in using laboratory equipment and quality control.

Duties: In co-operation with the international project manager, personnel of SEAPRODEX and individuals consultants to be engaged within the project, the Consultant is expected to:

(1) as laboratory technologist:

- purchase and installation of laboratory equipment;
- prepare a detailed work plan for the laboratory;
- prepare periodic reports over laboratory and quality control training/process as support for the Project Manager;
- determine testing and quality control methods/procedures to be introduced;
- assist in preparation of laboratory equipment specifications;
- train local staff in product development and quality control;
- participate in on-the job training of counterpart personnel in laboratory technology and quality control;
- assist the project manager in up-grading landing facilities to an acceptable hygienic standard.

The Laboratory Technologist will also be expected to prepare a final report , setting out all the findings his/her missions and recommendations to the Project Manager for the final report .

Qualifications Laboratory technologist with at least ten years experience in quality control and development of new products. Particularly in freezing, drying and canning of shrimps, squids and other marine products.

Language English.

APPENDIX V.

=====

PROJECT SCHEDULE

Sign. document.	October. 1988.
Tendering.	Nov.-Dec. 1988.
Evaluation.	Januar. 1989.
Purchase.	Januar. 1989.
Manufactoring of equipment.	Feb.- Sep. 1989.
Transport and clearance.	Sep.- Nov. 1989.
Erection.	Nov.- Dec. 1989.
Running in.	Jan.- Mar. 1990.
Commissioning.	Mar.- Apr. 1990.
Fish processing expert.	Januar 1989. Marts 1989. May 1989. Okt.- May. 1989 - 1990.
Laboratory expert.	Januar 1989. Jan.- May. 1990.
Study tour.	May 1989.
Fellowship.	Jun.- Aug. 1989.
Training at factory.	Dec.- Feb. 1989 - 1990.
Experts final report	May. 1990.
Tripartile revue	Jan.- Feb. 1990.